STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT
P.O. BOX 621
HONOLULU, HAWAII 96809

STAFF SUBMITTAL

COMMISSION ON WATER RESOURCE MANAGEMENT

June 29, 2011
Honolulu, Hawaii

Application for Stream Diversion Works Permit (SDWP.2789.6) to
Remove Kolea Reservoir and
Stream Channel Alteration Permit to Restore Kolea Stream
Kailua, Maui, TMK: (2) 1-1-001:050

APPLICANT:

State of Hawaii
Dept. of Accounting and General Services
1151 Punchbowl Street
Honolulu, HI 96813

LANDOWNER:

State of Hawaii
Dept. of Land and Natural Resources
1151 Punchbowl Street
Honolulu, HI 96813

SUMMARY OF REQUEST:

Application for Stream Diversion Works Permit (SDWP.2789.6) to remove Kolea Reservoir and Stream Channel Alteration Permit to Restore Kolea Stream in Kailua, Maui at TMK: (2) 1-1-001:050.

LOCATION: See Exhibit 1.

BACKGROUND:

In 1901, the Hamakua Ditch Company constructed the Kolea Reservoir, in the Koolau Forest Reserve approximately 2.5 miles southeast of the village of Kailua in East Maui and approximately one mile inland from the coastline. In 1908, East Maui Irrigation Company, Ltd. (EMI), a subsidiary of Alexander & Baldwin, Inc. (A&B) succeeded the Hamakua Ditch Company. Kolea Reservoir is one of many reservoirs that are part of EMI's irrigation system constructed in the late 1800s and early 1900s by A&B to transport and store water from East Maui to Central Maui to irrigate sugar cane fields.

In 1989, EMI registered four stream diversions in the Kolea watershed: two at the headwaters of Kolea Stream, one at Kolea Reservoir, and one below Kolea Reservoir. In the 1970s, EMI's leases with the State expired. EMI's ownership of Kolea Reservoir was transferred to the State. Since the 1970s the State has issued EMI year to-year revocable permits.

D2

DLNR is conducting a program to complete Phase I Dam Safety Inspections of all state-regulated dams as mandated by "Hawaii Dam and Reservoir Safety Act of 2007," Hawaii Revised Statute Chapter 179D, and Hawaii Administrative Rules Chapter 13-190, "Dams and Reservoirs." DLNR owns Kolea Reservoir (HI00097). It is a State-regulated dam classified as "intermediate" in size. DLNR Engineering rates Kolea's hazard condition classification as "low."

DLNR contracted with GEI Consultants, Inc. to perform Phase I dam inspections in the County of Maui. For dams with recent Phase I inspections, DLNR requested a follow-up inspection and report to judge the adequacy of the recent Phase I inspection report (in lieu of a new, independent Phase I inspection report).

On December 13, 2007, LFR, Inc. prepared a Phase I inspection report of the Kolea Reservoir for EMI. GEI reviewed LFR's Phase I report and background inspection. On March 7, 2008, GEI completed an independent site inspection. A site visit provided general background of the facility, site conditions, and a basis for judging LFR's Phase I findings and recommendations. GEI conducted its study in accordance with DLNR Report R92 "Guidelines for Safety Inspections of Dams," (December 1992).

GEI found the overall condition of Kolea Reservoir dam to be "CONDITIONALLY FAIR." According to DLNR's classification system "CONDITIONALLY FAIR" means:

> A potential dam safety deficiency is recognized for unusual loading conditions which may realistically occur during the expected life of the structure. CONDITIONALLY FAIR may also be used when uncertainties exist as to critical analysis parameters which identify a potential dam safety deficiency; further investigations and studies are necessary.

The condition of the embankment is not certain. Heavy bamboo prevented inspection of the entire downstream face and the condition of the outlet conduits.

The State and EMI determined that the reservoir is no longer needed for the storage of irrigation water. The cost to upgrade and maintain the reservoir is no longer warranted. Consequently, both the State and EMI agreed that the best alternative is to decommission Kolea Reservoir by removing most of the earth embankment dam, the catwalk, and the outlet works, and restore the site back to a natural stream.

In 2007-2008, the Hawaii State Legislature approved $14.5 million in Capital Improvement Project (CIP) funding for the remediation/removal of DLNR-owned dams. The $14.5 million CIP funding was delegated to the Department of Accounting and General Services (DAGS) to avoid any potential conflict of interest with DLNR overseeing the bidding and contracting process for the dam remediation program. Eight DLNR dams were earmarked for remediation, including Kolea Reservoir. Although the Kolea Reservoir Removal Project was ranked a low priority, the project was included in the removal program because of dam liability issues and the availability of funding. Although this project was funded for $2.2 million, DAGS awarded a contract for $700,000 to the low bidder.

DESCRIPTION:

Kolea Reservoir is an earth embankment dam that has six features: 1) spillway, 2) reservoir*, 3) catwalk*, 4) dam*, 5) reservoir outlet, and 6) water diversion structure below the reservoir (*to be removed). The earth embankment dam is about 200-feet long and 48-feet high. A 35-feet wide unpaved road runs along the crest. A portion of the dam is faced with rubble boulders on its upstream slope. The reservoir basin is about 475-feet long and 150-feet wide at its widest point. The reservoir stores irrigation water and is capable of impounding 20 acre-feet of storage at its normal operating level. (An acre-foot is a volume of water equal to one acre surface area to a depth of one foot or approximately 325,829 gallons). The water surface area of the reservoir is approximately two acres. The storage capacity is approximately 8 million gallons. The State of Hawaii and the U.S. Army Corps of Engineers classify the structure as an intermediate size dam based on storage capacity and height. See Exhibit 2.

During the removal of Kolea Reservoir, Kolea Stream will be diverted around the construction site via pipelines routed through the existing spillway. The dam embankment will be breached and graded to form a 15-foot wide channel with 2:1 side slopes. The side slopes will be stabilized with sprayed, seeded hydro mulch, or reinforced grass mats to stabilize the soil. Grass will be planted upstream of the new channel to control erosion. Check dams will be installed within the realigned stream in the reservoir basin until permanent vegetation stabilizes the soil. Check dams are rocks dams built across the width of the stream. They are at least one foot wide at the top and five feet wide at the bottom with 2:1 side slopes to control erosion and catch sediment. Once the grass is established, the stream bypass pipe line will be removed. The stream flow will be redirected to the new stream channel. Because of a significant drop in elevation from the upstream channel to the downstream embankment, a grouted riprap apron will be constructed to prevent erosion. See Exhibit 3.

Approximately 9,599 cubic yards of soil, (over 0.93 acres of the reservoir) will be removed from the dam embankment to create the breach and placed in the existing reservoir basin. It appears the soil for the dam embankment was originally excavated from the reservoir basin. Digging, grading, filling, compacting, planting, and other activities associated with the project will disturb the soil and create the possibility of soil migration during a heavy rainfall. The entire site will be grassed from the entrance to the reservoir to the new riprap structure to prevent erosion. Reinforced grass mats will stabilize the side slopes, and three check dams will be installed in the low flow stream channel upstream of the breach channel to catch sediment in the stream. Best management practices (BMPs) will include installation of 217 feet of silt fences, 16,695 square feet of erosion control blankets, temporary check dams. 62,745 square feet of grass will be planted to control erosion and minimize the transport of sediment.

Construction is scheduled to take place from June 2011 to November 2011. It will include temporary BMPs, stream bypass, dam removal, revegetation/soil stabilization and removing the stream bypass and temporary BMPs.

The dam removal and stream restoration will remove the hazard of dam water impoundment, allow a natural stream flow, reduce sediment transport, and restore the stream's ecosystem. The restored stream channel will not require maintenance and will be allowed to return to natural conditions.

ANALYSIS:

Agency Review Comments:

The U.S. Army Corps of Engineers (COE) noted that the applicant has applied for a Department of the Army Section 404 Permit.

The Department of Health (DOH) Clean Water Branch (CWB) comments:

- The project is subject to Clean Water Act Sections 401 and 404.
- The applicant submitted a Notice of Intent for National Pollutant Discharge Elimination System (NPDES) general permit coverage for discharges of storm water associated with construction activities.
- All discharges related to the project construction activities must comply with the State's Water Quality Standards (WQS).

The University of Hawaii Environmental Center asked:

- Who will pay for the project work? How much will it cost?
- Who would be responsible for the long-term maintenance of the realigned stream channel and for achieving long-term stream restoration goals?
- What are the proposed stream restoration objectives? How will they be achieved?
- How would stream flow and sediment transport regime change after project completion?

The Environmental Center's comments were forwarded to the State's consultant Oceanit for its information and response. The reservoir removal cost is $700,000. The State will be responsible for the long term maintenance of the realigned stream channel.

Oceanit conducted a survey of the coastline where Kolea Stream enters the ocean via a waterfall along a rugged coast line into deep water and determined that any potential sediment release into near shore deep water would not impact the coral growing in the area. To reduce sediment from entering coastal waters, the entire reservoir site will be grassed from the entrance to the existing reservoir with the new riprap structure to prevent erosion. The side slopes of the 15-foot wide stream channel will have reinforced grass mats to stabilize the side slopes. A series of check dams will be installed from the channel entrance upstream to where the stream water enters the existing reservoir to facilitate sediment settling out of stream water. A final check dam will be installed downstream of the riprap apron before the stream reaches the ocean.

The Department of Hawaiian Home Lands did not have any objections.

The U.S. Fish and Wildlife Service, Office of Hawaiian Affairs and County of Maui Planning Department did not submit comments.

DLNR Review Comments:

- State Historic Preservation Division (SHPD) concurred with Cultural Surveys Hawaii, Inc. "Archaeological Inventory Survey Report for the Kolea Reservoir Decommissioning Project..." recommendation that the site is significant under the National Register criteria for evaluating properties:
  - Criterion A: association with a period of great change in Hawaii followed by an influx of immigrant contract labors due to water availability for improved crop yields.
  - Criterion C: for its distinctive style and hand-built construction.
  - Criterion D: for information important to the understanding of water diversion techniques and structures employed during the early plantation period on Maui.

  SHPD agreed that the next step was to begin an architectural inventory survey in consultation with SHPD.
- Division of Forestry and Wildlife (DOFAW):
  - Contractor should mitigate trespassing during construction/demolition by users of the adjacent Waikamoi Trail complex, hunters and bamboo harvesters.
  - A hazard risk assessment should be conducted of the stream course between the dam location and Hana Highway relating to projected baseline flow and storm flow events. If the assessment recommends vegetation clearing or other mitigation measures, the associated costs should be included in the dam removal project.
  - Any type of field work relating to the proposed project requires a Forest Reserve "System Special Use Permit" approved by DOFAW.
- Division of Aquatic Resources requested more information on the amount of water that will flow into the Center Ditch diversion, monitoring and measuring the amount of water in the stream above and below the diversion during wet and dry conditions, and questioned the adequacy and suitability of grass in dealing with heavy runoff and turbid waters.
- Land Division: The parcel is owned by the state. Revocable Permit No. S-7264 is issued to Alexander and Baldwin. The contractor will need a right-of-entry issued by the Land Division to enter on State land.
- State Parks: not subject to its authority or permit.

Engineering did not submit comments as of the date of preparation of this submittal.

Chapter 343 Environmental Assessment (EA) Compliance Review:

EA Triggers: In accordance with HRS §343-5 (a), the applicant's proposed action triggers the need for an EA because the proposed project is located on State land and will use State funds.

In August 2010, Oceanit prepared a Draft Environmental Assessment (DEA) for the Kolea Reservoir (HI00097) Removal for the State of Hawaii, Department of Accounting and General Services (DAGS).

On May 23, 2011, the State Department of Health Office of Environmental Quality Control (OEQC) published the Final EA (FEA) and a Finding of No Significant Impact (FONSI) for the project.

Cumulative Impacts HAR §11-200-8 (b): No significant negative cumulative impacts are anticipated as a result of this activity because the proposed project is not part of a larger project, will remove Kolea Reservoir, and will restore Kolea Stream.

Staff Review

On February 23, 2010, Mason Architects Inc. completed a historic property and inventory survey of Kolea Reservoir and documented all the components of Kolea Dam and described their method of construction or design. The identified features include: the reservoir, dam embankment, catwalk, two outlet valves, spillway, diversion structure, and Center Ditch. Each feature and the surrounding property was analyzed for historic integrity and undiminished qualities in terms of location, setting, design, materials, workmanship, feeling, and association.

Mason Architects' Architectural Impact Survey (AIS):

- Determined that the site is significant under the National Register Criterion A, C and D as described above;
- Determined that there is no immediate threat to the safety of the dam and that the dam serves little or no economic value as it did in the past;
- Recommended dam abandonment because it is no longer serving its original purpose; and
- Recommended that its AIS be submitted to the State Historical Preservation Division (SHPD) to determine if the AIS satisfied the requirements of SHPD's Historic Architecture Branch.

On April 10, 2010, AECOS, Inc. investigated the aquatic environment for the applicant to determine whether or not there were any aquatic resources in Kolea Reservoir or the surrounding areas. AECOS surveyed aquatic biota at six locations in Kolea Stream, Kolea Reservoir and Center Ditch. AECOS' survey observed only a few species of aquatic invertebrate and insect at the six locations and no aquatic fish in the survey area (which included the stream, reservoir and ditch).

On July 2010, Cultural Surveys Hawaii conducted a Cultural Impact Assessment (CIA) for the decommissioning Kolea Reservoir. During the inventory survey, six features were observed. One feature, the water diversion structure, is located outside of the project area. The other five features (spillway, reservoir, catwalk, dam, reservoir outlet) are within the project area.

The CIA recommended that BMPs regarding the stream restoration be enforced during the decommissioning process as eventual restoration of the portion of Kolea Stream takes place. All efforts should be made to reduce silt runoff downstream and to maintain a healthy stream environment. The CIA also recommended that *mauka-makai* access be maintained to both the bamboo forest for the gathering of *takenoko* (bamboo shoots) and to potential gathering of other forest resources as well as access to the coast for fishing.

In August 2010, Oceanit prepared a Draft Environmental Assessment (DEA) for the Kolea Reservoir (HI00097) Removal for the State of Hawaii, Department of Accounting and General Services (DAGS).

On May 23, 2011, the State Department of Health Office of Environmental Quality Control (OEQC) published the Final EA (FEA) and a Finding of No Significant Impact (FONSI) for the project.

Kolea Stream is a perennial stream 1.8 miles in length. The watershed area is 0.6 square miles (see Division of Aquatic Resources Atlas of Hawaiian Watersheds & Their Aquatic Resources). Kolea Stream terminates as a waterfall at the ocean. No native aquatic resources have been identified in Kolea Stream. Kolea Stream is not part of the Commission's East Maui Interim Instream Flow Standard (IIFS) study.

In 1989, EMI filed four Registrations of Stream Diversion and Declaration of Water Use for Kolea Stream with the Commission. Two diversions are located at the headwaters of Kolea Stream. One diversion is located at Kolea Reservoir. One diversion is located below Kolea Reservoir. At the headwaters of Kolea Stream, one EMI diversion feeds the Wailoa Ditch. The other diversion feeds the New Hamakua Ditch. One diversion feeds Kolea Reservoir. One diversion below Kolea Reservoir feeds the Center Ditch. EMI does not have any stream gages at these stream diversion locations and no stream flow or diversion information.

Removing Kolea Reservoir is expected to have little or no impact on EMI's diversion structure located downstream of Kolea Reservoir or on Kolea Stream downstream of the diversion structure. The diversion structure is a concrete and rubble-structured "mixing pool" approximately 15 feet by 25 feet from which water is diverted to: (1) the Center Ditch by two, 12-inch diameter submerged pipes in the mixing pool and (2) Kolea Stream by an outlet two feet-six inch wide by four feet high in the mixing pool. The outlet is controlled by a vertically sliding gate that is submerged in the mixing pool. See Exhibit 4.

During high flow events, water will be diverted into EMI's two diversion intakes at the headwaters of Kolea Stream. The remainder will flow downstream into the realigned stream channel and the mixing pool. Since the holding capacity of the mixing pool is much smaller than the former reservoir that used to store water from Kolea Stream, excess water will flow over the diversion structure into Kolea Stream below. During low flow periods, all of the flow from Kolea Stream is captured in the mixing pool and diverted to the Center Ditch. The instream flow for Kolea Stream will not be impacted except during occasional high flow events that spill over the mixing pool into Kolea Stream.

RECOMMENDATION:

That the Commission approve the Applicant's 1) Stream Diversion Works Permit (SDWP.2789.6) to remove Kolea Reservoir and 2) Stream Channel Alteration Permit to restore Kolea Stream at TMK: (2) 1-1-001:050, subject to the standard conditions in Exhibit 5.

Respectfully submitted,

WILLIAM M. TAM
Deputy Director

Exhibits:
1. Location Map
2. Kolea Reservoir Sketch and Photos
3. Remediation Improvements Details
4. EMI Diversion Structure Sketch and Photos
5. Standard Stream Diversion Works Permit Conditions

APPROVED FOR SUBMITTAL:

WILLIAM J. AILA, JR.
Chairperson

Location map for Kolea Reservoir on Maui. North at top.

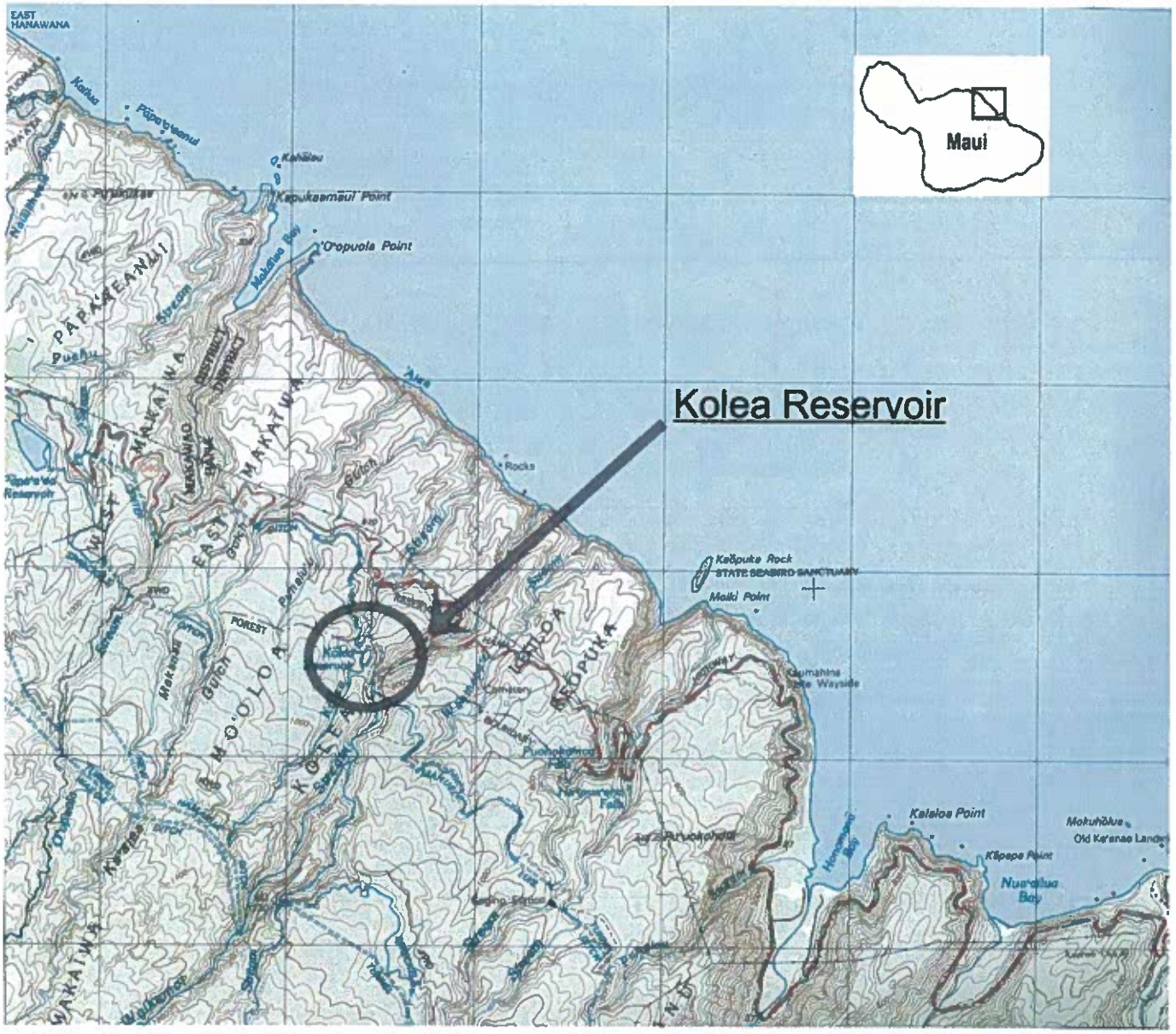


EXHIBIT 1

11. Photographs and Sketch Map

Sketch map showing the features of the Kolea Reservoir. Not to scale.

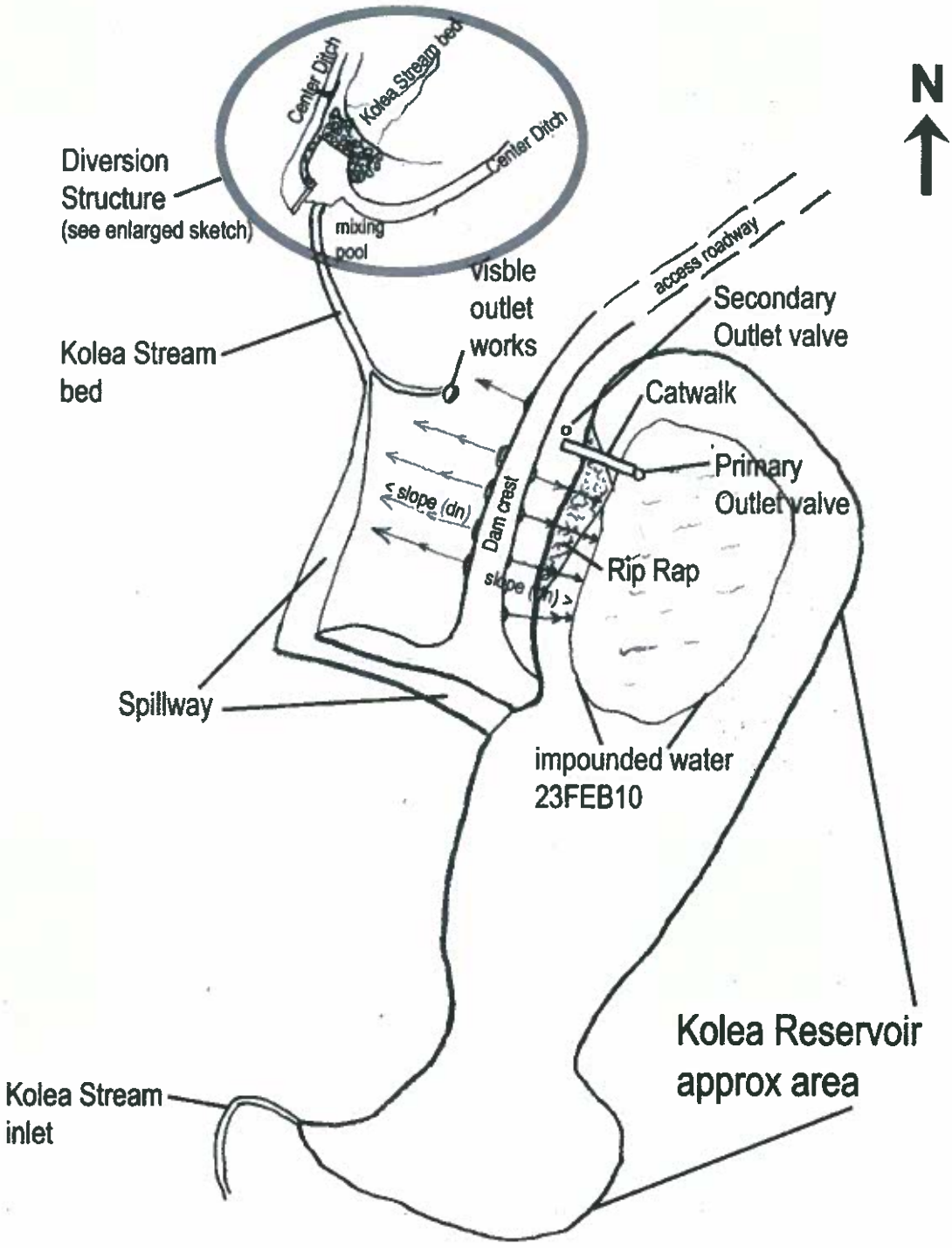


EXHIBIT 2

Figure 1-3. View of the Existing Reservoir and Catwalk

Figure 1-4. View of Inflow from Existing Stream

Figure 1-5. View of the Spillway Flowing Down to the Stream

Figure 1-6. View of Secondary Control Wheel
(The primary control wheel is located on the catwalk)

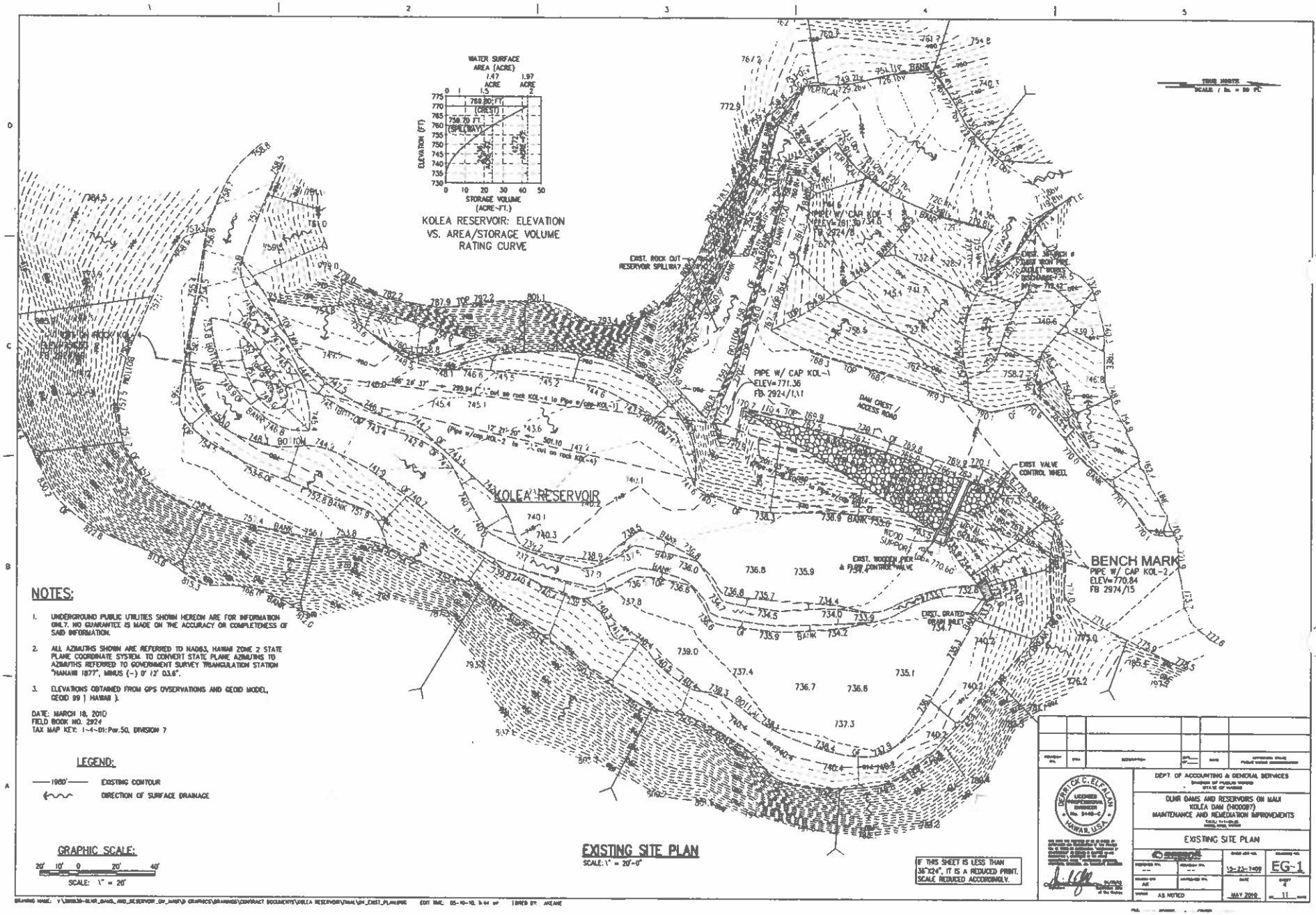
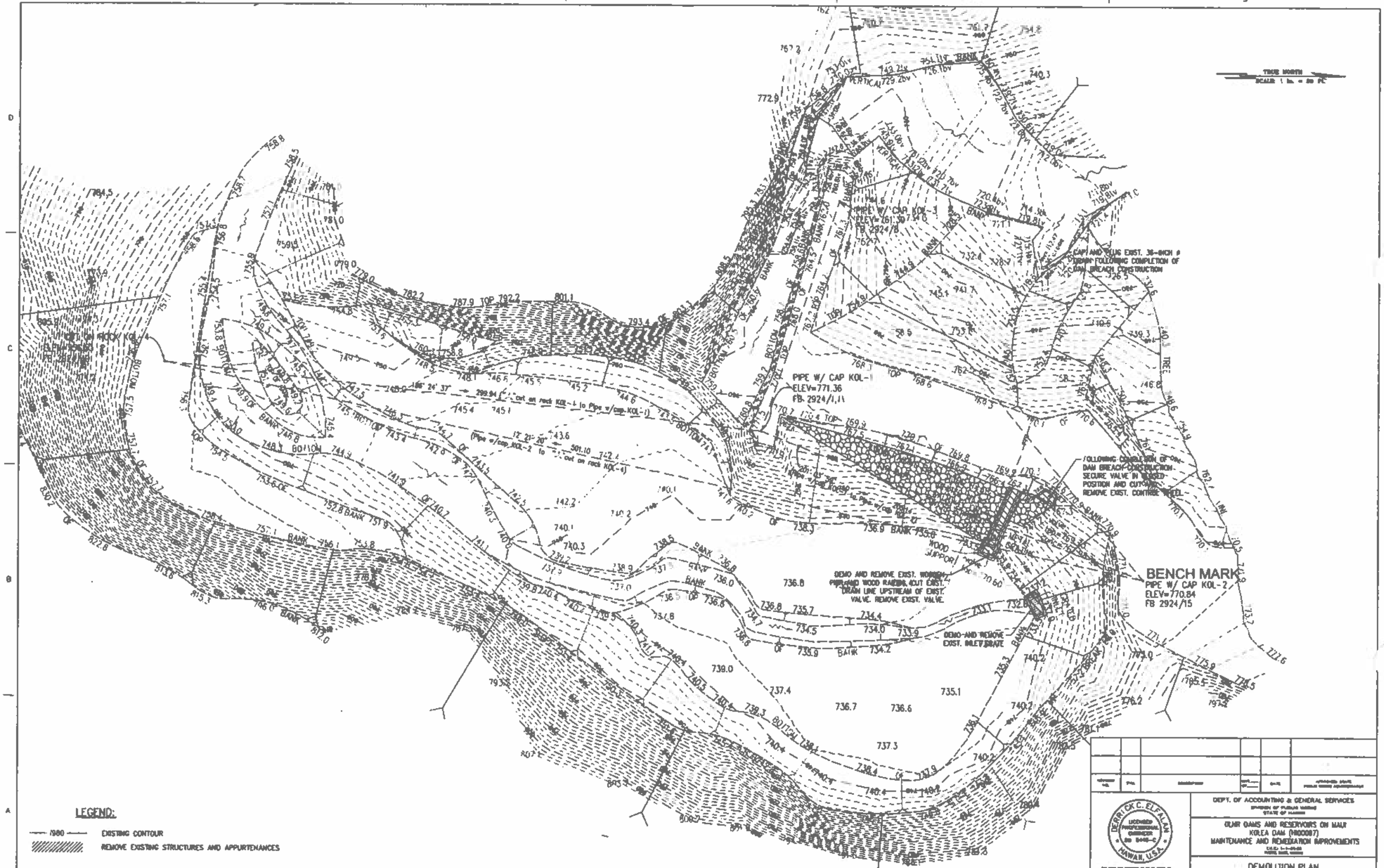

WATER SURFACE AREA (ACRE)
1.47 ACRE
1.97 ACRE
768.80 FT. (CREST)
758.70 FT. (SPILLWAY)
ELEVATION (FT)
STORAGE VOLUME (ACRE-FT.)
KOLEA RESERVOIR: ELEVATION VS. AREA/STORAGE VOLUME RATING CURVE
KOLEA RESERVOIR
PIPE W/ CAP KOL-1
ELEV=771.36
FB 2924/1,11
BENCH MARK
PIPE W/ CAP KOL-2
ELEV=770.84
FB 2974/15
DAM CREST / ACCESS ROAD
EXIST. VALVE CONTROL WHEEL
EXIST. WOODEN PIER & PUMP CONTROL VALVE
EXIST. GRATED DRAIN INLET
EXIST. ROCK CUT RESERVOIR SPILLWAY
EXIST. 30 INCH Ø CAST IRON PIPE OUTLET WORKS DISCHARGE
NOTES:
1. UNDERGROUND PUBLIC UTILITIES SHOWN HEREON ARE FOR INFORMATION ONLY. NO GUARANTEE IS MADE ON THE ACCURACY OR COMPLETENESS OF SAID INFORMATION.
2. ALL AZIMUTHS SHOWN ARE REFERRED TO NAD83, HAWAII ZONE 2 STATE PLANE COORDINATE SYSTEM. TO CONVERT STATE PLANE AZIMUTHS TO AZIMUTHS REFERRED TO GOVERNMENT SURVEY TRIANGULATION STATION "HANAMI 1877", MINUS (-) 0° 12' 03.8".
3. ELEVATIONS OBTAINED FROM GPS OVSERVATIONS AND GEOID MODEL, GEOID 99 (HAWAII).
DATE: MARCH 18, 2010
FIELD BOOK NO. 2924
TAX MAP KEY: 1-4-01: Por.50, DIVISION 7
LEGEND:
1960' EXISTING CONTOUR
DIRECTION OF SURFACE DRAINAGE
GRAPHIC SCALE:
20' 10' 0 20' 40'
SCALE: 1" = 20'
EXISTING SITE PLAN
SCALE: 1" = 20'-0"
IF THIS SHEET IS LESS THAN 36"X24", IT IS A REDUCED PRINT. SCALE REDUCED ACCORDINGLY.
DEPT. OF ACCOUNTING & GENERAL SERVICES
DAM CREST / ACCESS ROAD
DUNN DAMS AND RESERVOIRS ON MAUI
KOLEA DAM (140001)
MAINTENANCE AND REMEDIATION IMPROVEMENTS
EXISTING SITE PLAN
10-23-2009
EG-1
AS NOTED
MAY 2010
11

EXHIBIT 3



LEGEND:

— 1980 — EXISTING CONTOUR

REMOVE EXISTING STRUCTURES AND APPURTENANCES

GRAPHIC SCALE:

20' 10' 0 20' 40'

SCALE: 1" = 20'

DEMOLITION PLAN

SCALE: 1" = 20'-0"

IF THIS SHEET IS LESS THAN 36"X24", IT IS A REDUCED PRINT. SCALE REDUCED ACCORDINGLY.

DEPT. OF ACCOUNTING & GENERAL SERVICES

OLNR DAMS AND RESERVOIRS ON MAUI
KOLEA DAM (MA00087)
MAINTENANCE AND REMEDIATION IMPROVEMENTS

DEMOLITION PLAN

DERRICK C. ELFALAN
HAWAII, U.S.A.

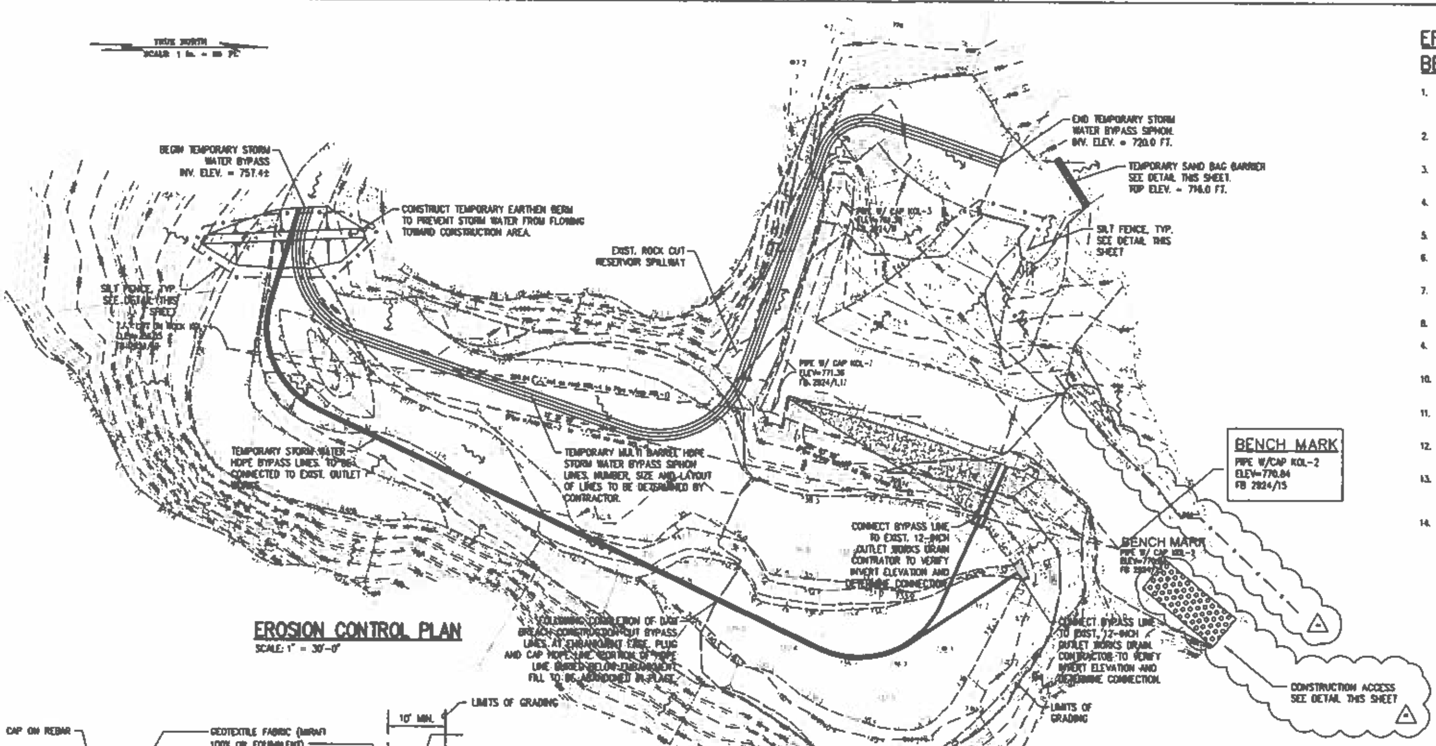
AS NOTED

15-23-/409

MAY 2010

EG-2

5

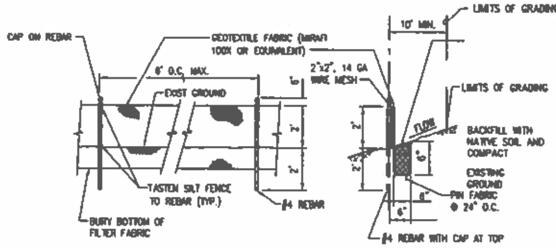


EROSION CONTROL PLAN

SCALE: 1" = 30'-0"

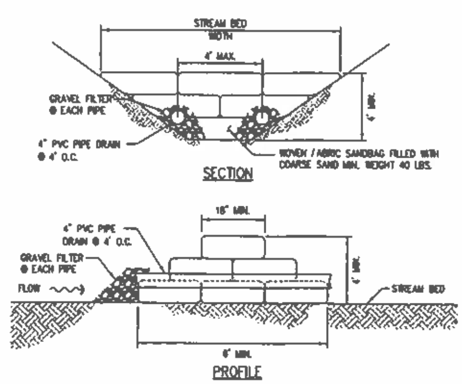
BENCH MARK

PIPE W/CAP KOL-2
ELEV=770.84
FB 2924/15



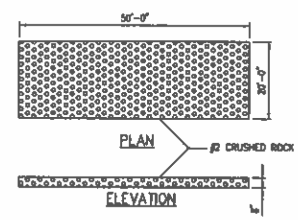
SILT FENCE DETAIL

NOT TO SCALE



SANDBAG BARRIER DETAIL

NOT TO SCALE



CONSTRUCTION ACCESS

NOT TO SCALE

LEGEND:

- 1980' — EXISTING CONTOUR
- LIMITS OF GRADING
- SILT FENCE (TEMPORARY)
- STORM WATER BYPASS SCHEMATIC (TEMPORARY)
- DIRECTION OF SURFACE DRAINAGE
- CONSTRUCTION ACCESS (TEMPORARY)
- SANDBAG BARRIER (TEMPORARY)

GRAPHIC SCALE:

30' 15' 0 30' 60'

SCALE: 1" = 30'

EROSION CONTROL NOTES AND BEST MANAGEMENT PRACTICES (BMPS):

1. MEASURES TO CONTROL EROSION AND OTHER POLLUTANTS SHALL BE IN PLACE BEFORE ANY EARTH MOVING WORK IS INITIATED. THESE MEASURES SHALL BE PROPERLY CONSTRUCTED AND MAINTAINED THROUGHOUT THE CONSTRUCTION PERIOD.
2. LIQUID SOIL STABALIZER SHALL BE DIRTGLUE POLYMER EMULSIONS BY DIRTGLUE ENTERPRISES OR EQUAL.
3. LIQUID SOIL STABILIZATION SHALL BE RE-APPLIED AT THE END OF EACH WORK DAY WHEN SURFACE OF EXISTING SOIL STABILIZER IS DISTURBED.
4. CONSTRUCTION SHALL BE SEQUENCED TO MINIMIZE THE EXPOSURE TIME OF CLEARED SURFACE AREA.
5. ALL CONTROL MEASURES SHALL BE CHECKED AND REPAIRED AS NECESSARY.
6. CONSTRUCT FACILITIES TO RETAIN ON-SITE WASTEWATER SUCH AS CHLORINATED WATER, HYDROSTATIC TESTING WATER, ETC. AND PERCOLATE INTO THE SOIL.
7. MAINTAIN SEDIMENT TRAPS AT DISCHARGE POINTS DURING SITE WORK AND UNTIL PERMANENT EROSION CONTROLS ARE IN PLACE.
8. CONSTRUCT CONSTRUCTION ACCESS FOR EACH INGRESS AND EGRESS.
9. PRE-CONSTRUCTION VEGETATIVE GROUND COVER SHALL NOT BE DESTROYED, REMOVED OR DISTURBED MORE THAN TWENTY (20) CALENDAR DAYS PRIOR TO SITE DISTURBANCE.
10. TEMPORARY SOIL STABILIZATION WITH APPROPRIATE VEGETATION SHALL BE APPLIED ON AREAS THAT WILL REMAIN UNFINISHED FOR MORE THAN THIRTY (30) CALENDAR DAYS.
11. PERMANENT SOIL STABILIZATION WITH PERENNIAL VEGETATION SHALL BE APPLIED AS SOON AS PRACTICAL AFTER FINAL GRADING.
12. STORM WATER FLOWING TOWARD THE CONSTRUCTION AREA SHALL BE DIVERTED BY USING APPROPRIATE CONTROL MEASURES AS PRACTICAL.
13. THE SUGGESTED STORM WATER BYPASSING PLAN IS SCHEMATIC ONLY. THE CONTRACTOR IS WHOLLY RESPONSIBLE FOR THE DETERMINATION OF ADEQUACY, CONSTRUCTION SEQUENCE, AND RELATED BYPASSING REQUIRED FOR CONSTRUCTION OPERATIONS.
14. A TABLE SHOWING ESTIMATED STORM FLOWS FOR DIFFERENT STORM RECURRENCE INTERVALS IS PROVIDED ON THIS SHEET FOR THE CONTRACTOR'S CONVENIENCE IN SIZING OF STORM WATER BYPASS SYSTEM.

KOLEA RESERVOIR: ESTIMATED STORM FLOWS

RECURRANCE INTERVAL (YEARS)	1-HOUR RAINFALL (INCHES)	KOLEA RESERVOIR BASIN INFLOW (CU. FT./SEC)
100	6.03	1,342
50	5.43	1,194
25	4.83	1,045
10	4.08	853
5	3.48	675
2	2.73	441

IF THIS SHEET IS LESS THAN 36"X24", IT IS A REDUCED PRINT. SCALE REDUCED ACCORDINGLY.

DERRICK C. ELFALAN
LICENSED PROFESSIONAL ENGINEER
No. 8449-C
HAWAII, U.S.A.

DEPT. OF ACCOUNTING & GENERAL SERVICES

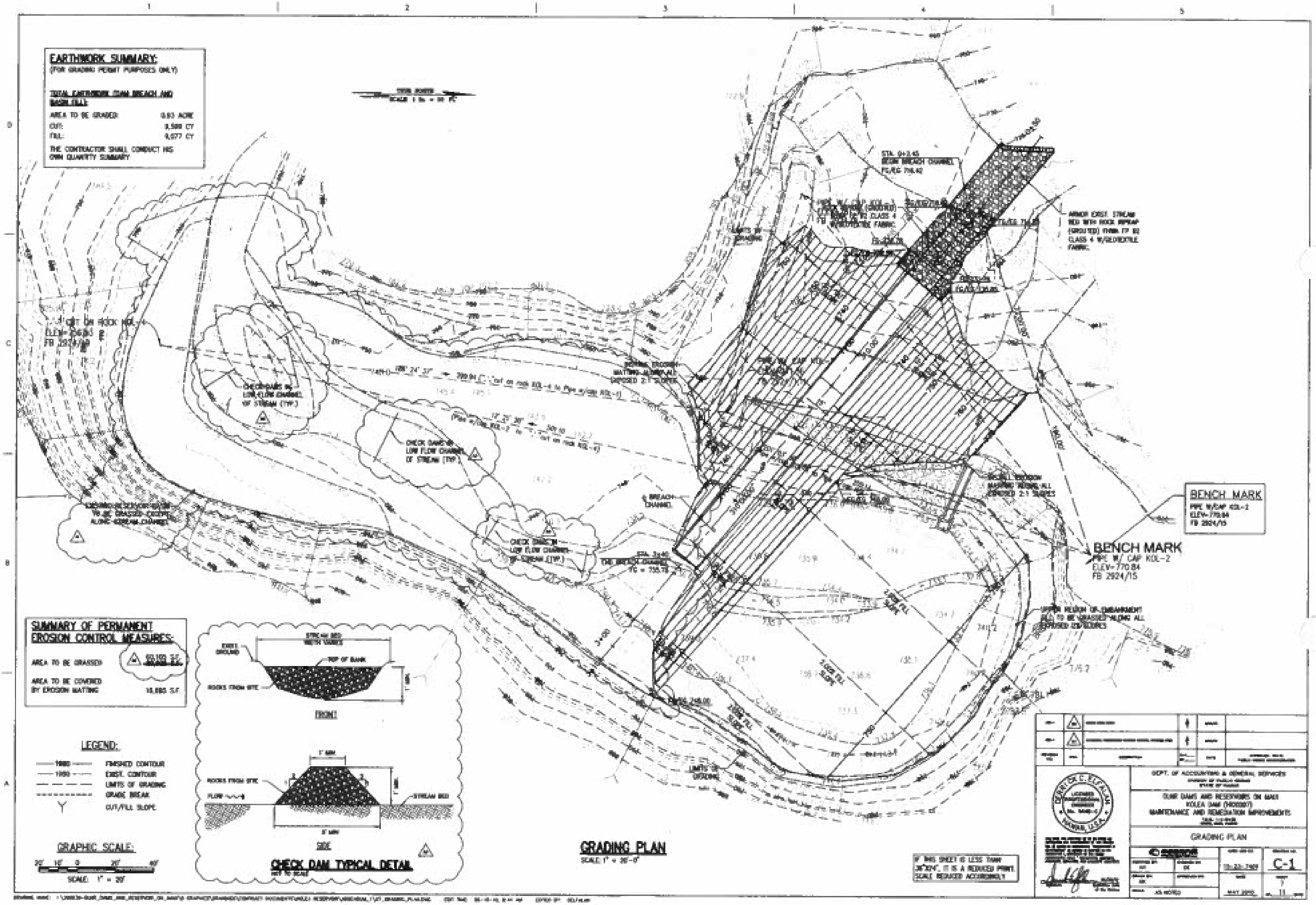
DLNR DAMS AND RESERVOIRS ON MAUI
KOLEA DAM (HI00007)
MAINTENANCE AND REMEDIATION IMPROVEMENTS

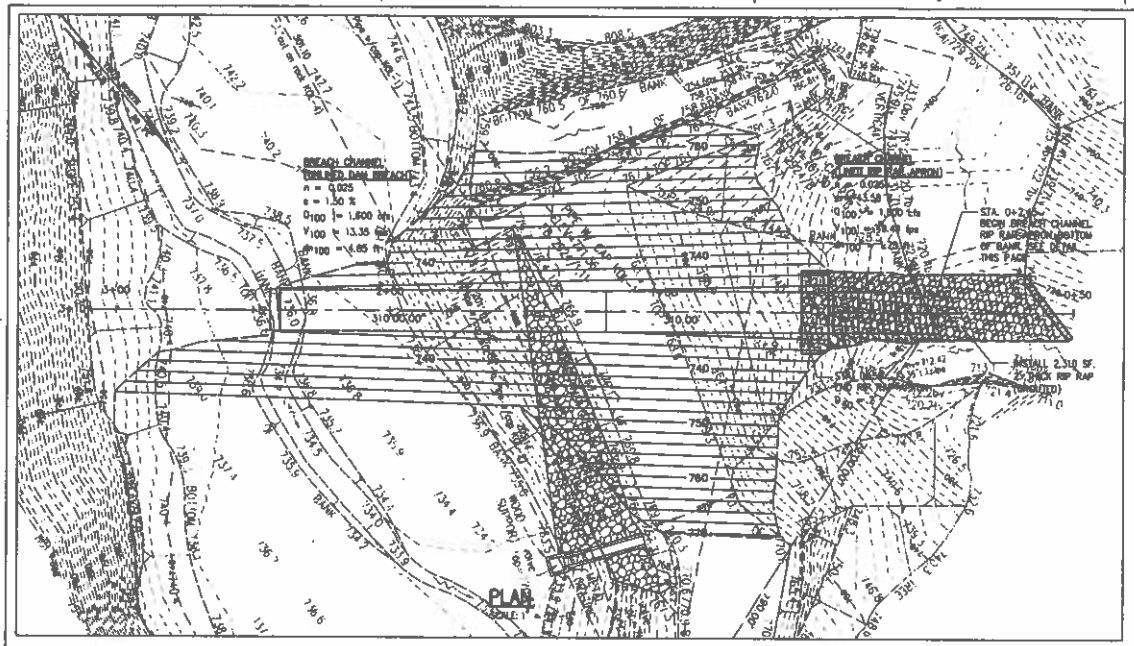
STREAM CHANNEL DIVERSION & EROSION CONTROL PLAN

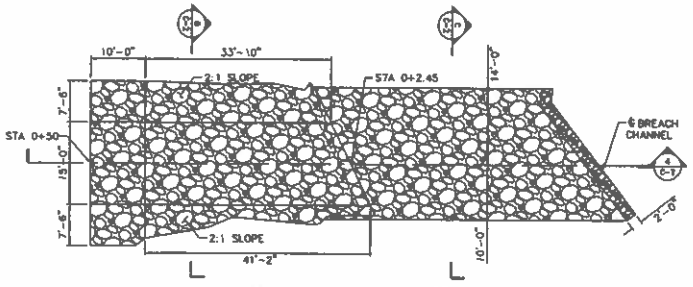
DE | AK | AS NOTED | 19-23-7409 | MAY 2010

EC-1

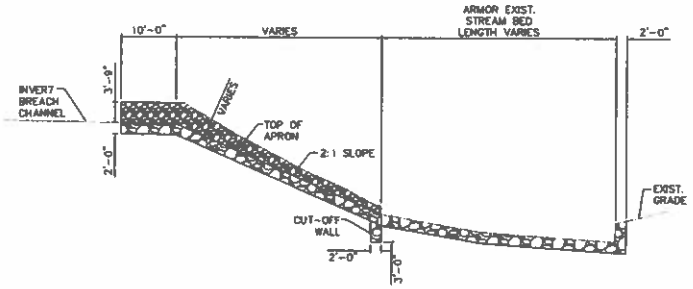
8 of 11


EARTHWORK SUMMARY:
(FOR GRADING PERMIT PURPOSES ONLY)
TOTAL EARTHWORK (DAM BREACH AND BASIN FILL):
AREA TO BE GRADED: 0.93 ACRE
CUT: 8,500 CY
FILL: 8,577 CY
THE CONTRACTOR SHALL CONDUCT HIS OWN QUANTITY SUMMARY
STA. 0+3.45
BEGIN BREACH CHANNEL
ARMOR EXIST. STREAM BED WITH ROCK RIPRAP (GROUTED) FHWA 17 02 CLASS 4 W/GEOTEXTILE FABRIC
CHECK DAMS IN LOW FLOW CHANNEL OF STREAM (TYP.)
BREACH CHANNEL
BENCH MARK
PIPE W/CAP KOL-2
ELEV=770.84
FB 2924/15
UPPER REGION OF EMBANKMENT FILL TO BE GRASSED ALONG ALL EXPOSED 2:1 SLOPES
LIMITS OF GRADING
SUMMARY OF PERMANENT EROSION CONTROL MEASURES:
AREA TO BE GRASSED
AREA TO BE COVERED BY EROSION MATTING 18,685 S.F.
LEGEND:
FINISHED CONTOUR
EXIST. CONTOUR
LIMITS OF GRADING
GRADE BREAK
CUT/FILL SLOPE
GRAPHIC SCALE:
SCALE: 1" = 20'
STREAM BED
TOP OF BANK
EXIST. GROUND
ROCKS FROM SITE
FRONT
FLOW
SIDE
CHECK DAM TYPICAL DETAIL
NOT TO SCALE
GRADING PLAN
SCALE: 1" = 20'-0"
IF THIS SHEET IS LESS THAN 36"X24", IT IS A REDUCED PRINT. SCALE REDUCED ACCORDINGLY.
DEPT. OF ACCOUNTING & GENERAL SERVICES
KOLEA DAM
MAINTENANCE AND REMEDIATION IMPROVEMENTS
GRADING PLAN
C-1
AS NOTED
MAY 2010

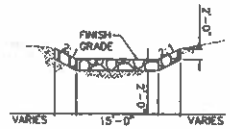




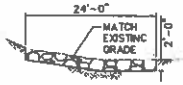
RIP RAP APRON DETAIL
SCALE: 1" = 10'



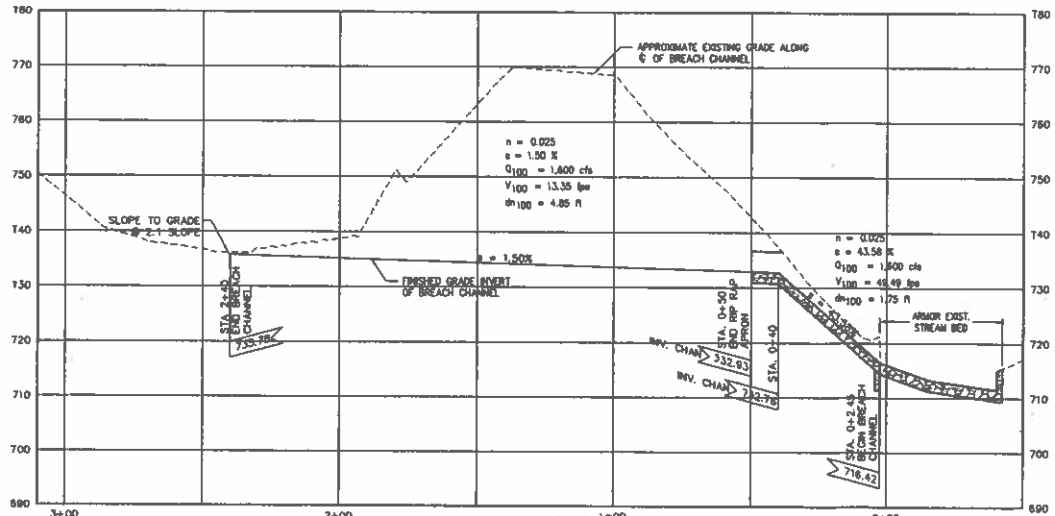
SECTION A



SECTION B



SECTION C



PROFILE BREACH CHANNEL
SCALE: HOR.: 1" = 20'-0"
VER.: 1" = 10'-0"

IF THIS SHEET IS LESS THAN
36"X24", IT IS A REDUCED PRINT.
SCALE REDUCED ACCORDINGLY.

GRAPHIC SCALE:

SCALE: 1" = 20'

SCALE: 1" = 10'

DERRICK C. ELFALAN
LICENSED PROFESSIONAL ENGINEER
No. 6440-C
HAWAII, U.S.A.

DEPT. OF ACCOUNTING & GENERAL SERVICES
DIVISION OF PUBLIC WORKS
STATE OF HAWAII

DLNR DAMS AND RESERVOIRS ON MAUI
KOLEA DAM (H000087)
MAINTENANCE AND REMEDIATION IMPROVEMENTS
KAUAI, HAWAII
MAUI, HAWAII

BREACH CHANNEL - PLAN & PROFILE

DESIGNED BY: AE	DRAWN BY: DE	DATE: 12-22-2009	DRAWING NO.: C-2
CHECKED BY: AE	APPROVED BY:	DATE:	SHEET NO.: 8
SCALE: AS NOTED		DATE: MAY 2010	OF 11 SHEETS

GRAPHIC NAME: I:\300830-BLNR_DAMS_AND_RESERVOIRS_ON_MAUI\0 GRAPHICS\DRAWINGS\CONTRACT DOCUMENTS\KOLEA RESERVOIR\FINAL\BR_ BREACH_PLAN_PROF.DWG EDIT TIME: 05-10-10, 9:46 AM EDITED BY: AKEANE

Enlarged sketch map of diversion structure below Kolea Reservoir. Not to scale.

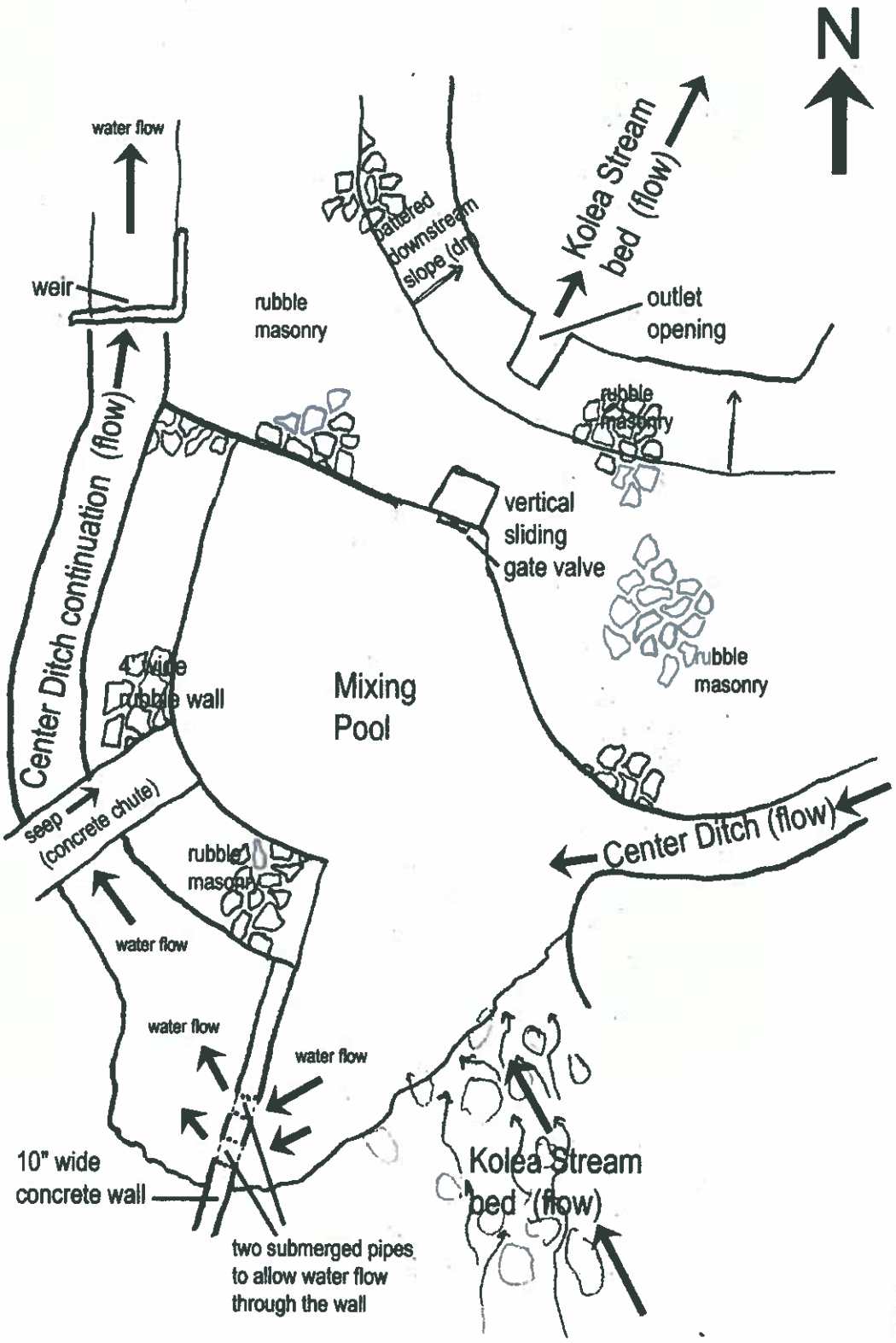


EXHIBIT 4

Photograph 8. HI_ Maui County_Kolea Reservoir_8. View of the diversion structure below the Kolea Reservoir looking downstream. The Center Ditch inlet is on the right. In the right foreground is the rocky bed of the Kolea Stream with the flow from the reservoir outlet and spillway entering the mixing pool. The 10" wide concrete wall extends up from the (off camera) foreground. The continuation of the Center Ditch is on the left side of the 10" wide wall. View facing northeast.

Photograph 9. Hi_ Maui County_Kolea Reservoir_9. Diversion structure looking upstream. The mixing pool is in the upper center of the photo with the 4' wide wall and continuation of the Center Ditch on the right. Note the wide wall (dam) extending up to the left that impounds the mixing pool. The rectangular outlet works can be seen on the downstream side of the wide wall (dam). The Kolea Stream bed below the diversion structure extends to the left of the photo. View facing southwest.

STANDARD STREAM DIVERSION WORKS PERMIT CONDITIONS
(Revised 9/19/07)

1. The permit application and staff submittal approved by the Commission at its meeting on June 29, 2011, shall be incorporated herein by reference.

2. The applicant shall comply with all other applicable statutes, ordinances, and regulations of the Federal, State and county governments.

3. The applicant, his successors, assigns, officers, employees, contractors, agents, and representatives, shall indemnify, defend, and hold the State of Hawaii harmless from and against any claim or demand for loss, liability, or damage including claims for property damage, personal injury, or death arising out of any act or omission of the applicant or his successors, assigns, officers, employees, contractors, and agents under this permit or related to the granting of this permit.

4 The applicant shall notify the Commission, by letter, of the actual dates of project initiation and completion. The applicant shall submit a set of as-built plans and photos of the completed work to the Commission upon completion of this project. This permit may be revoked if work is not started within six (6) months after the date of approval or if work is suspended or abandoned for six (6) months, unless otherwise specified. The proposed work under this stream channel alteration permit shall be completed within two (2) years from the date of permit approval, unless otherwise specified. The permit may be extended by the Commission upon showing of good cause and good-faith performance. A request to extend the permit shall be submitted to the Commission no later than three (3) months prior to the date the permit expires. If the commencement or completion date is not met, the Commission may revoke the permit after giving the permittee notice of the proposed action and an opportunity to be heard.

5. Before proceeding with any work authorized by the Commission, the applicant shall submit one set of construction plans and specifications to determine consistency with the conditions of the permit and the declarations set forth in the permit application.

6. The applicant shall develop site-specific, construction best management practices (BMPs) that are designed, implemented, operated, and maintained by the applicant and its contractor to properly isolate and confine construction activities and to contain and prevent any potential pollutant(s) discharges from adversely impacting state waters. BMPs shall control erosion and dust during construction and schedule construction activities during periods of low stream flow.

7. The applicant shall protect and preserve the natural character of the stream bank and stream bed to the greatest extent possible. The applicant shall plant or cover lands denuded of vegetation as quickly as possible to prevent erosion and use native plant species common to riparian environments to improve the habitat quality of the stream environment.

8. In the event that subsurface cultural remains such as artifacts, burials or deposits of shells or charcoal are encountered during excavation work, the applicant shall stop work in the area of the find and contact the Department's Historic Preservation Division immediately. Work may commence only after written concurrence by the State Historic Preservation Division.

EXHIBIT 5